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Color Display System User's Guide

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for

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This document contains instructions for executing a color display simulation on the Patriot Tactical Operations Simulator (PTOS). Materials include information needed for collecting data for operator performance measures and information about the procedure for changing display colors and switch/indicator locations. Some familiarity with the PTOS and the MPX operating system is assumed.

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COLOR DISPLAY SYSTEM USER'S GUIDE

1.0 INTRODUCTION

1.1 PURPOSE

This document contains the information necessary for a user to run a Color Display System (CDS) PTOS simulation, including data collection for Operator Performance Measures and information about the procedure for the changing of display colors and switch/ indicator locations. Some familiarity with the PTOS and the MPX operating system is assumed.

1.2 GETTING STARTED

In order to run a CDS simulation first ensure that the 1.5B MPX operating system disk packs have been booted in CPU2 and CPU3. The power switch at the back of the CDS console and the power switch on the terminal next to the console must be turned on. The last step before starting is to ensure that the keyboard in front of the console has the "caps lock" light on.

2.0 CDS SIMULATION

To begin a CDS simulation the following procedure should be followed. While in the TSM mode type in X$CTOS then press the return key (<RET>). EXAMPLE

```
TSM> X$CTOS<RET>
```

You will then be asked a series of questions that must each be answered followed by a <RET>. The questions and the valid responses are given below. (It is beyond the scope of this document to include questions that are only relevant to PTOS and not CTOS, so these questions will not be discussed.)

1) IS THIS A PTOS OR CDS RUN (C OR P)? -
   -C<RET> will allow you to run a COLORTOS simulation.
   -P<RET> will allow you to run a PTOS simulation.
2) DO YOU WISH TO INCLUDE THE OPERATOR PAC (Y OR N) -
   -Y<RET> Operator PAC data collection will be done.
   -N<RET> no Operator PAC data will be collected.
   -<RET> same as N.
3)* ENTER THE OPERATOR ID -
   - up to 8 characters followed by <RET>. The characters may be alphabetic, numeric or a combination. This information will be used during data reduction.
4) ENTER SCENARIO FILE NAME -
   -the filename of a valid, predefined scenario file<RET>
5) ENTER RUN TIME DECK FILE NAME -
   - the name of a valid run time deck file <RET>
6)+ ENTER FILE NAME FOR COLOR DECK -
   - the filename of a predefined color deck file<RET>.
   -<RET> a monochrome TOS scenario will be displayed on the Raster ONE/80.

7)+ ENTER FILE NAME FOR SWITCH DECK (CR IF DEFAULT) -
- the filename of a predefined switch deck file<RET>.
-<RET> the scenario will be run using the default switch configuration.

8) ENTER FILE NAME FOR DATA COLLECTION OUTPUT -
- the filename to be used in data reduction<RET>. Valid filenames are DCFILE1, DCFILE2, DCFILE3, and DCFILE4.

9) ENTER EVENT CALENDAR FILE NAME (CR IF NONE) -
- the filename for the event calendar file to be used by the simulation<RET>.
-<RET> the simulation will run without an event calendar

10) ENTER START TIME FOR DISPLAY IN SECONDS -
- the number of seconds at which to begin the display of the scenario (in scenario time)<RET>. Valid responses are from 0 to the total number of seconds in the scenario.

11) ENTER BATTALION NUMBER (1-4) -
- the number (from 1-4) of a battalion that is defined in the scenario<RET>.

12) ENTER FIRE PLATOON NUMBER (0-6) -
- the number (from 1-6) of the fire platoon, of the above chosen battalion, which is to be diplayed<RET>.
-0<RET> the battalion chosen in #11 will be displayed.

* This question will only be asked if the answer to question #2 is "Y".
\+ This question will only be asked if the answer to #1 is "C".

2.2 DISPLAY COLORS

While in the "EDIT" mode the user should "USE" an already defined color deck file. The user can them simply modify the file by either changing the color definition, the color assignments or both. The editor command to save the new file would be

STO filename UNN SYS

STO tells the computer to store the file under the name given in filename. The filename can be the same one being currently used or a new filename. UNN tells the computer to store the file as an unnumbered file. This part of the command must always be used in storing all color deck files. SYS tells the computer to store the file as a system file so that the simulation will have access to it.

2.2.1 Color Definition

The definition of each color is done by defining its red, green and blue components. In orders to change a color definition a user must edit the appropriate color deck file and change the color component values for the color desired.

The very first part of the colordeck is the &COLORDEFN portion. An example of a color deck is given in figure 2.2.1. Each line in this portion pertains to a specific color number (ie. color #1 is on the first line of the color definition part). The user can change the RGB components of the appropriate color. For example, if color 18 should be changed to black, the user would modify line 18 to read 000,000,000 which defines the red, green and blue components of black. One restriction applies to the changing of the color definitions; colors 1 (black), 2 (red), 3 (green), and 4 (blue) have been predefined and cannot be changed to other color values. Changing their values will have no effect.

2.2.2 Assignments

There are three types of assignments which can be made in the color deck, they are color, fill value, and precedence. Color assignments are done by finding the object for which the assignment is being made, such as Feba color (variable FEBACOL), and putting the desired color's number on the right of the equal sign. In the example of the Feba, to make it red the assignment would be:

FEBACOL=2, (Note: the line must end in a comma)

To fill in certain objects, a fill value must be set to either true (fill in that object) or false (do not fill in). This type of assignment is done in the same general manner as a color assignment, except that the value is true or false, not a color number. To fill in prohibited volumes, the assignment would be:

PROHFILL=.TRUE.,

(Note: the values are .TRUE. and .FALSE., with both periods and again, ending the line with a comma)

The precedence values specify what will be done in cases where one type of volume overlaps another type on the display. Precedence is specified by a numeric value, either a 1, 2, or 3, and only a 1, 2 or 3. The higher the value, the higher the precedence. The volume with the higher precedence will overlay one with a lower precedence. Because of the nature of precedences, the three types of volumes (Origin, Weapon Control, and the remaining volumes) must be given unique values. Examples of the precedence assignments are given in figure 2.2.1.

2.3 Changing the Functionality of Buttons

There are two steps to changing the function of a specific button. The first is to physically change the label of that button, the second is making the new function assignment available to the simulation through use of the button deck.

```
  &COLOR_DEFNS
   RGB_COMPONENTS=
   000,000,000,                          ! color #1
   255,000,000,                          ! color #2
   000,255,000,                          ! color #3
   000,000,255,                          ! color #4
     .
     .
     .
     .
  &END
C
 &LINECOL                                ! line color assignements
  FEBACOL = 1,                           ! febas
  SECTCOL = 1,                           ! sector bounds
  MASKCOL = 1,                           ! masked terrain
  RANGCOL = 1,                           ! range rings
  SRCHCOL = 1,                           ! search sectors
  TRKBCOL = 1,                           ! track bounds
  PATHCOL = 1,                           ! paths
 &END                                    ! end of line colors
C
C
 &SYMBCOL                                ! symbol color assignments
  GENPCOL = 1,                           ! general points
  CRGCOL = 1,                            ! CRG
  BATTCOL = 1,                           ! battalion
  FIRECOL = 1,                           ! fire platoon
  HOSTCOL = 1,                           ! hostile
  FRNDCOL = 1,                           ! friend
  UNKCOL = 1,                            ! unknown
  RECTCOL = 1,                           ! rectangle
  PNTRCOL = 1,                           ! pointer
  TRIACOL = 1,                           ! triangle
  CROSCOL = 1,                           ! crossed angle
  LANGCOL = 1,                           ! angle touching line
  JAMRCOL = 1,                           ! jammer
  NRTHCOL = 1,                           ! north symbol
 &END                                    ! end of symbol colors
C
C
 &POLYCOL                                ! polygon colors
  FRORCOL = 1,                           ! friendly origin volume
  HSORCOL = 1,                           ! hostile origin volume
  WTCVCOL = 1,                           ! weapons tight control
                                         ! volume
```

Figure 2.2.1

```
   WHCVCOL = 1,                    ! weapons hold control
                                   ! volume
   WFCVCOL = 1,                    ! weapons free control
                                   ! volume
   PROHCOL = 1,                    ! prohibited volume
   RESTCOL = 1,                    ! restricted volume
   CORRCOL = 1,                    ! safe passage corridor
   DEFACOL = 1,                    ! defended asset
   BACKCOL = 2,                    ! situation display
                                   ! background color
  &END
C
C
  &POLYFILL                        ! polygon fill flags
   FRORFILL = .TRUE.,              ! friendly origin volume
   HSORFILL = .TRUE.,              ! hostile origin volume
   WTCVFILL = .TRUE.,              ! weapons tight control
                                   ! volume
   WFCVFILL = .TRUE.,              ! weapons free control
                                   ! volume
   WHCVFILL = .TRUE.,              ! weapons hold control
                                   ! volume
   PROHFILL = .FALSE.,             ! prohibited volume
   RESTFILL = .FALSE.,             ! restricted volume
   CORRFILL = .FALSE.,             ! safe passage corridor
   DEFAFILL = .FALSE.,             ! defended asset
   SRCHFILL = .TRUE.,              ! search area
   TRKBFILL = .TRUE.,              ! track boundary
  &END
C
C
  &POLYPREC                        ! polygon precedence WRT
                                   ! other polygons
   ORGNPREC = 1,                   ! origin volumes
   VOLMPREC = 2,                   ! volumes
   WEPNPREC = 3,                   ! weapons control volumes
  &END
C
C
  &TABCOL                          ! tabular display colors
   TABDCOL  = 1,                   ! tabular  display  basic
                                   ! color
   TABBCOL = 1,                    ! tabular display back-
                                   ! ground
   ATC1COL = 1,                    ! ATC = 1 (of TBEQ display) entry
   ATCRCOL = 1,                    ! ATC = 2-9 (of TBEQ display) entry
   RTTZCOL = 1,                    ! release time to zero message color
&END
```

Figure 2.2.1 (concluded)

2.3.1 Button Deck Assignments

Each button entry in the button deck has two parts. The part that gives a function number and the part that gives the panel location. This is done through an assignment statement of the form FUNCTNAM(FN)=PL, where FN is the function number and PL is the panel location. An example of a fire platoon button deck is given in figure 2.3.1a

For example, in order to assign ID AREAS function to the leftmost top button, the first step would be to use table 1 (table 2 for battalion) to find the function number. ID AREAS is given as function number 12. The next step would be to find the desired location number by using figure 2.3.1b. It is location 104. Then a fire platoon button deck (for example, X$FPDEF) would be edited to change the location part of the button assignment. The new assignment would be:

FUNCTNAM(12)=104, (Note the ending comma)

Only the location number would need to be changed, and note that if another function had been previously assigned location 104, it would have to be reassigned a new location. No two functions can be assigned to the same panel location. If this occurs, the results are unpredictable. The editor command to save the changed file is

STO newfilename UNN SYS

which will store the file as an unnumbered system file for use by the simulation.

2.3.2 Default Button Decks

The default assignments for the fire platoon and battalion panels are given in figures 2.3.2a and 2.3.2b. The default button deck filenames are X$FPDEF for fire platoon and X$BATDEF for battalion. These files can be used as a starting point to define a new button deck, but these files should not themselves be changed.

2.3.3 Changing the Labels

In order to make the switch/indicators reflect the button deck, the labels on any buttons that have been changed must be moved to the new location. This is done be pulling the button out of the panel and sliding the button cover off. The label can then be removed and replaced with the correct label. The cover must be put back on and the button pushed firmly back into the panel.

```
C
&FCONMODE                              !CONSOLE MODE BUTTONS
FUNCTNAM(1)=1,FUNCTNAM(2)=2,           !FUNCT1 is ECCM ASSIST; 2 is EQUIP CONTR
FUNCTNAM(3)=3,FUNCTNAM(4)=4,           !FUNCT3 is FRNDLY PROT; 4 is WPN CONTR
&END
C
&FMAPDATA                              !MAP DATA BUTTONS
FUNCTNAM(5)=5,FUNCTNAM(6)=6,           !FUNCT5 is MASK TERR; 6 is GEOREF GRID
FUNCTNAM(7)=7,FUNCTNAM(8)=8,           !FUNCT7 is WPN CONTR AREAS; 8 is DEF ARE
FUNCTNAM(9)=9,FUNCTNAM(10)=10,         !FUNCT9 is SECTOR BOUNDS; 10 is RANGE RI
FUNCTNAM(12)=12,                       !FUNCT12 is ID AREAS
&END
C
&FTRACKDA                              !TRACK DATA BUTTONS
FUNCTNAM(13)=13,FUNCTNAM(14)=14,       !FUNCT13 is Display HOST; 14 is Display
FUNCTNAM(15)=15,FUNCTNAM(16)=16,       !FUNCT15  is Display FRNDS; 16 is ALT A
FUNCTNAM(17)=17,FUNCTNAM(20)=20,       !FUNCT17 is LNIPS; 20 is ALT B
FUNCTNAM(21)=21,FUNCTNAM(24)=24,       !FUNCT21 is PIPS; 24 is ALT C
FUNCTNAM(25)=25,FUNCTNAM(26)=26        !FUNCT25 is ECM STRBS; 26 is TRACK DATA
FUNCTNAM(27)=27,FUNCTNAM(28)=28,       !FUNCT27 is TRACK NOS; 28 is ALT D
&END
C
&FSCALE                                !OFFSET/SCALE BUTTONS
FUNCTNAM(30)=30,FUNCTNAM(31)=31,       !FUNCT30 is X4; 31 is X2
FUNCTNAM(32)=32,FUNCTNAM(34)=35,       !FUNCT32 is FULL; 34 is OFFSET
FUNCTNAM(35)=36,                       !FUNCT35 is CNTR
&END
C
&FTABDISP                              !TABULAR DISPLAY SELECT BUTTONS
FUNCTNAM(36)=37,FUNCTNAM(37)=38,       !FUNCT36 is FAULT DATA; 37 is FB STATUS
FUNCTNAM(38)=39,FUNCTNAM(39)=40,       !FUNCT38 is FREE FORM; 39 is CONTR DATA
FUNCTNAM(40)=41,FUNCTNAM(41)=42,       !FUNCT40 is OPER ASSESS; 41 is MSL INVNT
FUNCTNAM(43)=44,                       !FUNCT43 is ENG DATA
&END
C
&FACKNLDG                              !ALERT ACKNOWLEDGE BUTTONS
FUNCTNAM(51)=52,                       !FUNCT51 is ALERT ACK
&END
C
&FENGMODE                              !ENGAGEMENT MODE BUTTON
FUNCTNAM(52)=57,                       !FUNCT52 is AUTO/SEMI AUTO
&END
```

Figure 2.3.1a

```
C
&FENGINIT                              !ENGAGEMENT INITIATE BUTTONS
FUNCTNAM(53)=53,FUNCTN...(55)=58,      !FUNCT53 is ENG; 55 is SALVO
FUNCTNAM(56)=59,FUNCTNAM(57)=60,       !FUNCT56  is  RIPPLE;57 is SHOOT-LOOK-SHOO
FUNCTNAM(59)=56,                       !FUNCT59 is TVM SPOOF
&END

C
&FENGOVER                              !ENGAGEMENT OVERRIDE BUTTONS
FUNCTNAM(61)=62,FUNCTNAM(62)=63,       !FUNCT61 is ENG HOLD;62 is CEASE FIRE
FUNCTNAM(63)=64,FUNCTNAM(64)61,        !FUNCT63 is HOLD FIRE;64 IS DISABLE
&END
C
&FTRACKEV                              !TRACK EVALUATE BUTTONS
FUNCTNAM(65)=65,FUNCTNAM(66)=66,       !FUNCT65 is TRAILS;66 is TRK AMPL DATA
FUNCTNAM(67)=67,FUNCTNAM(68)=68,       !FUNCT67 is IFF;68 is DROP TRACK
FUNCTNAM(69)=69,FUNCTNAM(70)=70,       !FUNCT69 is HOST;70 is UNK
FUNCTNAM(71)=71,FUNCTNAM(72)=72,       !FUNCT71 is FRND;72 is SPEC
&END
C
&FSYSCONT                              !SYSTEM CONTROL BUTTONS
FUNCTNAM(73)=77,FUNCTNAM(74)=73,       !FUNCT73 is AREAS ENABLE;74 is WPNS FREE
FUNCTNAM(75)=74,FUNCTNAM(76)=75,       !FUNCT75 is WPNS TIGHT;76 is WPNS HOLD
FUNCTNAM(77)=79,FUNCTNAM(78)=80,       !FUNCT77 is AUTON;78 is INDEP
&END
C
&FCONTROL                              !RADAR/IFF/LAUNCHER CONTROL BUTTONS
FUNCTNAM(81)=85,FUNCTNAM(82)=86,       !FUNCT81 is LS8 OPER/STBY;82 is LS7 OP/STB
FUNCTNAM(83)=87,FUNCTNAM(84)=88,       !FUNCT83 is LS6 OPER/STBY;84 is LS5 OP/STB
FUNCTNAM(85)=89,FUNCTNAM(86)=90,       !FUNCT85 is LS4 OPER/STBY;86 is LS3 OP/STB
FUNCTNAM(87)=91,FUNCTNAM(88)=92,       !FUNCT87 is LS2 OPER/STBY;88 is LS1 OP/STB
FUNCTNAM(89)=99,FUNCTNAM(90)=100,      !FUNCT89 is ECCM ENABLE;90 is THRESH HI/LO
FUNCTNAM(91)=95,FUNCTNAM(92)=96,       !FUNCT91 is MODE 4 ENABLE;92 is SIF ENABLE
FUNCTNAM(93)=93,FUNCTNAM(94)=94,       !FUNCT93 is ALTER SECTOR 2;94 is ALT SECT
FUNCTNAM(95)=97,FUNCTNAM(96)=98,       !FUNCT95 is DROP SHORT RANGE;96 is LONG RN
&END
```

Figure 2.3.1a (concluded)

FIRE PLATOON BUTTON FUNCTIONS

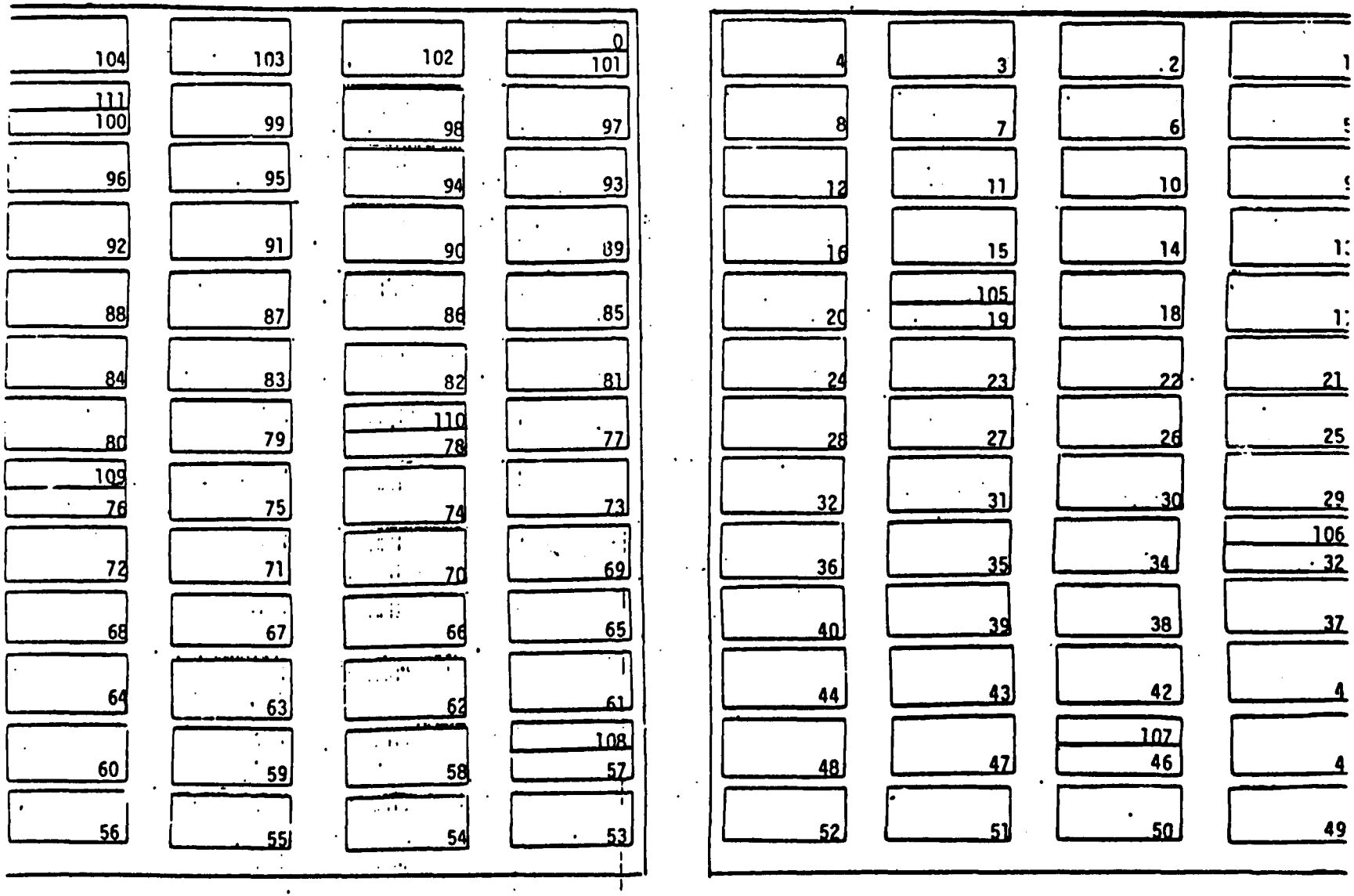
ALERT ACK	51	FULL	32	TRACK NOS	27
ALT A	16	GEOREF GRID	6	TRAILS	65
ALT B	20	HOLD_FIRE	63	TRK AMPL DATA	66
ALT C	24	HOST	69	TVM SPOOF	59
ALT D	28	HOSTS	13	UNK	70
ALTER SECTOR_1	94	ID AREAS	12	UNKS	14
ALTER SECTOR 2	93	IFF	67	WPN CONTR	4
AREA ENABLE	73	INDEP	78	WPN CONTR AREAS	7
AUTO/SEMI AUTO	52	LNIPS	17	WPNS FREE	74
AUTON	77	LS1 OPER/STBY	88	WPNS HOLD	76
CEASE FIRE	62	LS2 OPER/STBY	87	WPNS TIGHT	75
CENTR	35	LS3 OPER/STBY	86	X2	31
CONTR DATA INDEX	39	LS4 OPER/STBY	85	X4	30
DCNTR	79	LS5 OPER/STBY	84		
DEFEND AREAS	8	LS6 OPER/STBY	83		
DISABLE	64	LS7 OPER/STBY	82		
DROP LONG RANGE	96	LS8 OPER/STBY	81		
DROP SHORT_RANGE	95	MASK TERR	5		
DROP TRACK	68	MODE 4 ENABLE	91		
ECCM ASSIST	1	MSL INVNT	41		
ECCM ENABLE	89	OFFSET	34		
ECM STRBS	25	OPER ASSESS	40		
ENG	53	PIPS	21		
ENG DATA	43	RANGE_RINGS	10		
ENG HOLD	61	RIPPLE	56		
EQUIP CONTR	2	SALVO	55		
FAULT DATA	36	SECTOR BOUNDS	9		
FREE FORM MSG	38	SHOOT-LOOK-SHOOT	57		
FRND	71	SIF ENABLE	92		
FRNDLY PROT	3	SPEC	72		
FRNDS	15	THRESH HI/LO	90		
FS STATUS	37	TRACK DATA	26		

TABLE 1

BATTALION BUTTON FUNCTIONS

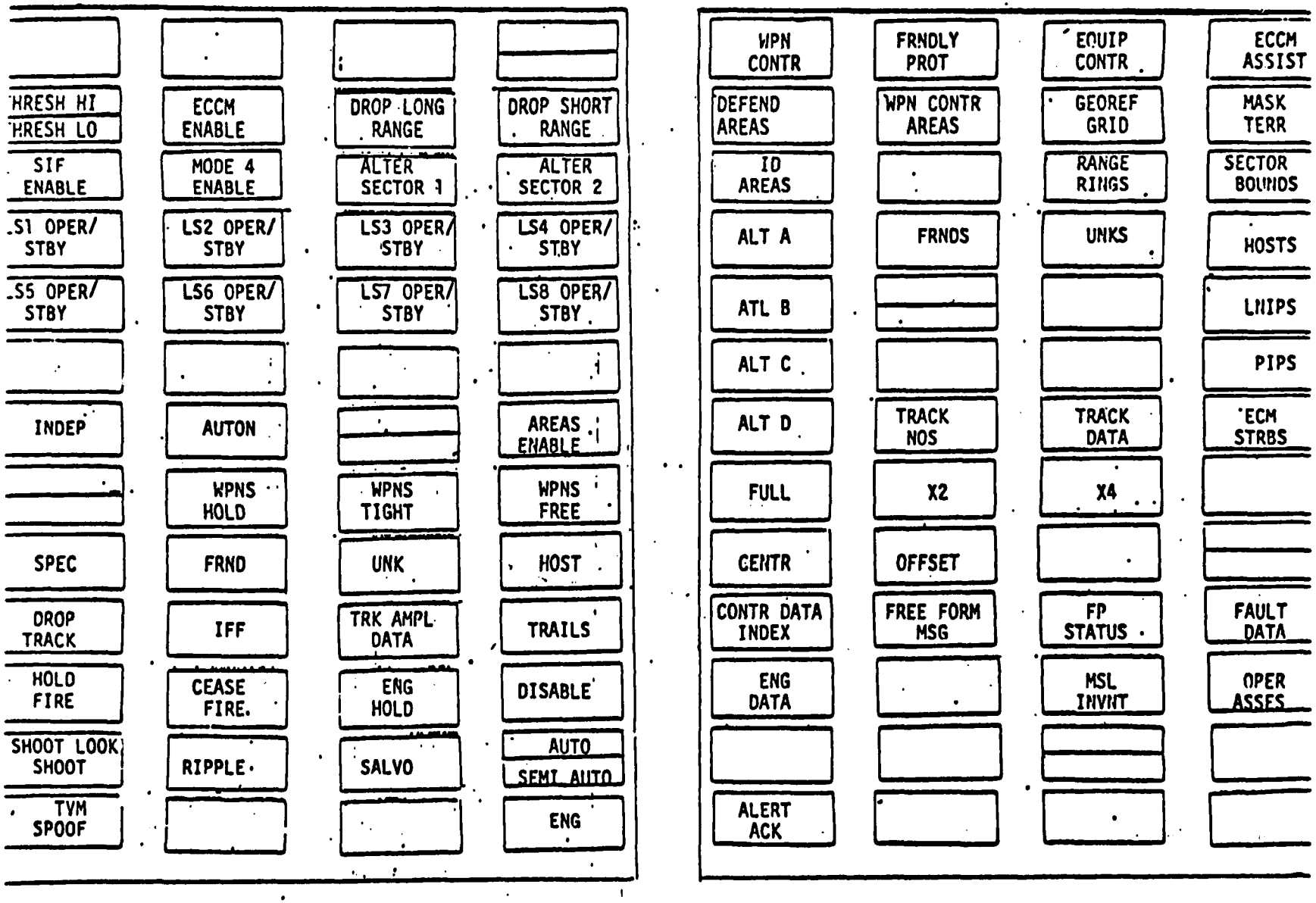
ADDRESS	96	FP STATUS	41	SEL FP	59
ADJ BN A	91	FP 1	87	SELECT ALT	28
ADJ BN B	90	FP 2	86	SEMI	52
ADJ BN C	89	FP 3	85	SHOOT LOOK SHOOT	57
ALERT ACK	51	FP 4	83	SOURCE	96
ALL FP	84	FP 5	82	SPEC	72
ALT A	16	FP 6	81	TBE	18
ALT B	20	FREE FORM MSG	38	TBE DATA 1	47
ALT C	24	FRND	71	TBE DATA 2	46
AREAS ENABLE	73	FRNDLY PROT	2	TOS	94
ATMAC	93	FRNDS	15	TRAILS	65
AUTO	52	FULL	32	TRK ARP DATA	66
BN STATUS	43	GEO REF GRID	6	TRK DATA	26
BN TRKNG SUM	42	GROUP	95	TRK NOS	27
CANNOT COMPLY	49	HAVE COMPLIED	48	UNK	70
CCG STATUS	44	HOLD FIRE	63	UNKS	14
CEASE FIRE	62	HOST	69	WILL COMPLY	50
CENTR	35	HOSTS	13	WPN CONTR AREAS	7
CMND PLAN	1	ID AREAS	12	WPNS FREE	74
CNTR CONTR	80	IFF	67	WPNS HOLD	76
CONTR DATA INDEX	39	LNIPS	17	WPNS TIGHT	75
DCNTR CONTR	79	MAP INDEX	37	X2	31
DEFENDED AREAS	8	MAP SELECT	10	X4	30
DISABLE	64	MASK TERR	5	X8	29
DROP TRACK	68	OFFSET	34	2ND FP	58
ECM STROBES	25	OPER ASSESS	40		
ENG	22	ORIGIN VOLS	11		
ENG	53	PFE	54		
ENG HOLD	61	PIPS	21		
ENGAGE CONTR 1	4	RIPPLE	56		
ENGAGE CONTR 2	3	SALVO	55		
FAULT DATA	36	SECTOR BOUNDS	9		

Table 2



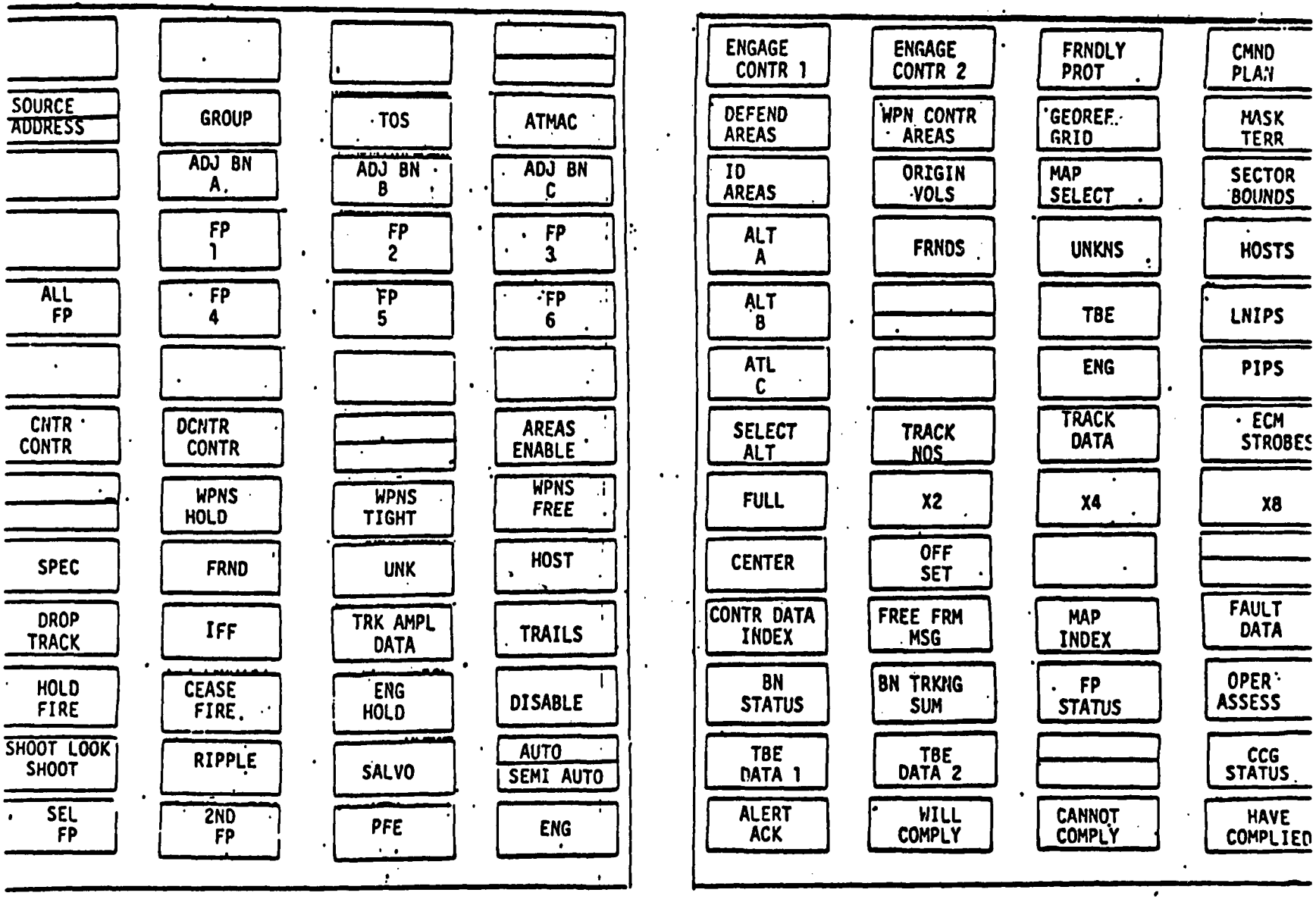
LOCATIONS OF BUTTONS

FIGURE 2.3.1b



FIRE PLATOON

FIGURE 2.3.2a



BATTALION
FIGURE 2.3.2b

3.0 Operator Performance Measures

The Operator PAC collects data during the simulation for later data reduction to help assess operator performance. The simulation will only collect the data if the user specifies that data collection is desired (Section 2.1). If the user requests the operator PAC then the simulation will query the user for an operator ID (Section 2.1). The operator ID can be up to 8 characters (numeric and/or alphabetic) long. One of the questions the simulation asks is the name of the data collection file to be used. Valid data collection file names are currently DCFILE1, DCFILE2, DCILFE3, and DCFILE4. This file will be used during data reduction.

After the simulation has been completed the user can run the data reduction, X$DREDOP. The following questions would be answered as shown below.

```
IS THIS A CLASSIFIED RUN: N
DATA FILE NAME: The name of the DCFILE used during simulation
PRINT TITLE PAGE? Y
PRINT DETAILED EVENT OUTPUT? Y
START TIME: 0.
END TIME (ALL=0.): 0.

SPECIFY BATTALIONS AND FIRE PLATOONS FOR DETAILED OUTPUT
(FORMAT: N/IJK M/IL (ALL=0/0) ): 0/0
MISSLE DATA ONLY? N
MESSAGES ONLY? N
PRINT EVENT SUMMARIES? N or Y
PRINT MONTE CARLO STATISIECS? N
PLOT HISTOGRAMS? N
PLOT FP INTERCEPTS? N
```

In order to take the datato ARI for further operator performance data reduction, the data would be put on tape by mounting a tape on CPU3 and then running X$FL2TP, a program which will put the data on the tape.